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Bidirectional microwave-optics conversion in the quantum ground state for qubit interconnection

I will present a microwave-optics converter based on the Pockels effect that has recently shown an unprecedented combination of high conversion efficiency and low added output noise. This system, which also demonstrates a high bandwidth of ~ 10 MHz, should enable proof of principle experiments such as quantum state transfer from one dilution fridge to another, or generation of entangled optics-microwave pairs for remote qubit entanglement.

After a quick overview of the system's principle and underlying physics, I will describe the experiments that are currently tried in our lab, as well as longer term prospects for quantum computation.